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MINISTRY OF AGRICULTURE AND FISHERIES

Bulletin No. 4

# BUSH FRUITS

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## FOREWORD

THE cultivated soft fruits comprise three distinct groups—the bush fruits, the cane fruits, and strawberries. This third group is already the subject of a separate bulletin (No. 95, *Strawberries\**); and hitherto the bush and cane fruits have been dealt with in one publication. To deal adequately with each of these groups it has now been decided to make them the subject of separate bulletins: the first of these, *Bush Fruits*, deals with black currants, red currants and gooseberries, and the second, *Cane Fruits*, dealing with raspberries, blackberries, loganberries, and related cane fruits is in preparation.

At the invitation of the Fruit Group of the National Agricultural Advisory Service (under the Chairmanship of Professor T. Wallace, C.B.E., with Dr. H. B. S. Montgomery as Deputy Chairman), Mr. J. Turnbull provided the draft script of the section on black currants, and Mr. W. G. Kent that for the section on red currants and gooseberries. The Group is also indebted to Mr. J. M. S. Potter, Director of the National Fruit Trials, for the detailed descriptions of varieties given in all three sections. The information on pests and diseases and their control has been supplied by the Ministry's Plant Pathology Laboratory.

*Ministry of Agriculture and Fisheries*

*November, 1950*

\* Bulletin 95, *Strawberries*. Obtainable from H.M. Stationery Office or through any bookseller, price 2s. 6d. (2s. 7½d. by post).

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# BUSH FRUITS

## BLACK CURRANTS

The black currant crop was well established in the fruit-growing areas of England and Wales by the early years of this century mainly as an under-crop to top fruits in Kent and Worcestershire.

In 1908 the approximate area under the crop in England and Wales was 6,000 acres, and was 7,500 acres just before the 1914-18 war. A rapid expansion took place after that war and the area rose to 13,700 acres in 1929. This peak acreage coincided with the beginning of the economic depression and was accompanied by a severe fall in market prices. As a result black currant growing received a severe check and the acreage fell consistently over a period of 5 years to 9,500 acres in 1934. Gradually new plantings expanded the area under black currants to 10,400 acres in 1939, almost half of which was in Kent and Norfolk. The war of 1939-45 resulted in the grubbing of many old plantations which were not replaced, to any extent, by new plantings so that by 1945 the acreage stood at only 8,400 acres, the lowest since 1913. Since that year, however, the acreage has steadily recovered; the June 4th Returns for 1948 gave a figure of 12,400 acres of black currants for England and Wales, which in 1949 had increased to 15,200 acres. 1950 was the peak year with 16,400 acres, but 1952 saw a slight decline to 15,000 acres. The principal areas of production are Norfolk, Kent and the West Midlands.

### Improvement in Yields

In 1908 the approximate estimated yield per acre over the whole country was only 9 cwt.; in 1928 it was around 15.5 cwt. per acre, and this figure rose to 25.4 cwt. in 1939, although serious drops were experienced in frost years such as 1944 when the yield was only 14.5 cwt. per acre. The gradual increase reflects a growing appreciation and production of disease-free material by growers, following research into the incidence and control of Reversion and Black Currant Gall mite (Big Bud) and the general upgrading of nursery stock under the Ministry of Agriculture's Certification Scheme.

### Management

The crop is best grown alone in the open and not under tree fruits. The heavy manuring required by black currants is unsuitable for apples, but is less so for plums. The sprays applied to apples also may harm black currants, whereas those required for plums are usually less harmful. Occasionally black currants are planted under young cherries, though the disturbance when the bushes are grubbed may damage the cherry roots and lead to suckering.

### Certification

A voluntary scheme for the inspection and certification of certain varieties of black currant bushes is operated by the Ministry of Agriculture. Certificates issued under this scheme relate to the purity and apparent freedom of



the stocks from Reversion and other major insect pests and diseases at the time of inspection. The operation of this scheme enables intending planters to obtain bushes of a known standard of merit.

Bushes which have been planted out for more than five years are not accepted for inspection under the certification scheme unless they have been stooled. "Maiden" bushes are not accepted, because Reversion is difficult to detect in bushes of this age.

Careful management is required to maintain black currant bushes at a sufficiently high standard to qualify for a certificate, and intending applicants are advised to write to the Ministry of Agriculture and Fisheries, Horticulture Branch 1, 3, Whitehall Place, London, S.W.1, for full particulars of the scheme and information relating to its conditions.

Advice on the source of cuttings, methods of propagation, cultivation, spraying and roguing for Reversion is given elsewhere in this bulletin.

Cuttings and plants are liable to become mixed in commercial handling and a constant watch is therefore needed to keep the stock true to type. Growers with sufficient experience will be able to rogue for trueness of variety at the same time as they rogue for Reversion.

The main differences in varieties are to be seen in the leaves, but recognition requires considerable experience. Other differences more easily recognized become apparent in the buds and leaf stalks as the season progresses. For example, the buds of the *French* and *Boskoop* groups are red; those of the *Baldwin* and *Goliath* groups are whitish, sometimes with red splashes. This enables certain mixtures to be sorted out during the dormant stage. Again, the main summer growths take on different colours in late June and early July. Varieties in the *Baldwin* group and their crosses then become pink. Early in July *Wellington XXX* becomes a brownish pink, and *Mendip Cross* purplish pink, thus distinguishing them from the other *Baldwin* crosses. Varieties in the *Goliath* group and their crosses become whitish or greenish, with leaf stalks of a similar colour and without red markings on them. Varieties of the *French* and *Boskoop* groups have a greenish top, but the leaf stalks either have pink splashes or are entirely pink, and this contrasting colour is very marked.

## Labour Requirements

Routine cultivations make no special demand on labour. Provided that sufficient labour is available for spring and early-summer hoeing, especially in young plantations, and suitable horse or tractor implements are employed for inter-row cultivations, no special difficulty should arise.

In the picking season, however, ample casual labour is a necessity and, before planting any large acreage, an intending grower should gain some idea of the labour likely to be available.

As a general guide 20 pickers will clear one ton of fruit per day if working on piece rates.



## Site, Soil and Climate

In general black currants thrive on a wide variety of soils. It is evident, however, that the best results are obtained on deep, medium to light, loamy soils. The main requirement is a soil that encourages free rooting, with a good supply of moisture during the summer months.

Although the black currant has a greater tolerance of impeded soil drainage conditions than other fruits, anything approaching waterlogging is harmful. Heavy soils are very difficult to maintain in the required condition of good tilth, while shallow soils may be too dry in the summer. A high standard of tillage operations combined with heavy applications of bulky organic manures can do much to ameliorate inferior soil conditions without adversely affecting fruit quality.

Frequently, the variety *Baldwin*, and some varieties having *Baldwin* as one parent, make a much smaller bush than other varieties when the land is heavy, whereas there is little or no difference when it is light.

The selection of a suitable site is very important. Although the richer, deeper soils in valley sites would produce larger bushes and yield heavier crops in seasons free from frosts than those on more elevated sites, the risk of frost is too great to be taken. It is better to choose a frost-free site, even though the soil may not be quite so good. It is equally important that the bushes should not be subjected to cold winds, as fruiting is dependent on pollination by honey-bees and other insects, and the bees especially will not work under cold conditions. Also bushes do not grow so well in windy situations. Shelter from northerly or easterly winds is therefore highly desirable, but anything in the nature of a frost-pocket should be avoided in favour of a situation from which cold air can drain on to lower land.

The black currant can succeed under conditions of fairly high rainfall provided that June and July are not unduly wet.



## DESCRIPTIVE NOTES ON VARIETIES

### BALDWIN

An old variety of unknown origin. *Bush* : Generally of medium vigour, varying with soil and locality, fairly compact. Commences growth early and flowers early. *Trusses* : Usually one to two per spur, medium in length, each containing 6 to 9 berries. *Berry* : Medium size, colour and flavour good ; skin tough, hangs and travels well. *Season* : Late.

A good late variety for localities where it is known to do well. Requires generous manuring. The fruit is rich in vitamin C, hangs well and is always in demand for preserving purposes. One of the least liable to "running-off" but rather susceptible to Leaf Spot in the West Country. Not sulphur-shy.

### BALDWIN (HILLTOP)

A selection from **Baldwin** ; it is generally a little more vigorous than the type but otherwise practically identical. Until comparative cropping trials have been carried out, it is impossible to state whether there is any significant difference between the characters of these types. Not sulphur-shy.

### BLACKSMITH

Raised by Messrs. Laxton Bros., Bedford, and introduced in 1916. *Bush* : Vigorous, making a large to very large bush, slightly spreading in habit. *Trusses* : Usually one to two, moderately long, each containing 7 to 10 berries. *Berry* : Medium to large, of good flavour and colour. Skin tough, travels well. *Season* : Mid-season.

A heavy cropper in certain localities. The slightly spreading habit of the bush can be corrected by appropriate pruning. Not sulphur-shy.

### BOSKOOP GIANT

Raised by Messrs. Hoogendyk, Holland, about 1885 and introduced into England about 1895. *Bush* : Vigorous, large and slightly spreading. Begins growth about mid-season and flowers about mid-season. *Trusses* : Usually only one, occasionally two, usually long, containing 8 to 10 berries. *Berry* : Large, juicy, moderately sweet, with a thin and rather tender skin. *Season* : Early.

This is only a moderate cropper. It is the earliest variety to ripen, but fruit does not hang well and should be picked before terminal berries are fully coloured. It is rather liable to "running-off" in a cold spring, and is susceptible to Leaf Spot in the west. Not sulphur-shy.

### COTSWOLD CROSS

*Origin* : **Baldwin** × **Victoria**. Raised in 1920 by Mr. G. T. Spinks, Long Ashton Research Station, and introduced in 1932. *Bush* : Moderately vigorous, medium to large with a rather spreading habit. Flowers early. *Trusses* : Usually two, moderately long, each containing 7 to 9 berries. *Berry* : Medium to rather small and uniform in size, sub-acid, good colour, skin thick, travels well. *Season* : Late, a few days after Baldwin.

A variety that at present is more popular in the west than in other parts of the country. Where it does well it is said to crop heavily but the "strig" is thick and this affects the general appearance of the fruit. Not sulphur-shy.



## DANIELS'S SEPTEMBER

Probably this variety arose as a sport from **Baldwin**, being first noticed in 1915 and introduced by Messrs. Daniels, of Norwich, in 1923. It is somewhat similar to Baldwin in most characters, but tends to grow more vigorously, particularly as the bushes become older. The fruiting habit is practically identical with Baldwin, but ripening is considerably later and the fruit hangs well. It is a very useful variety for extending the picking season. The main disadvantage of this variety is its persistent "sporting" habit which results in whole branches or even whole bushes reverting to the Baldwin season of ripening. Where propagation is being undertaken, care should be taken to select cuttings only from bushes true to type. Not sulphur-shy.

## DAVISON'S EIGHT

Raised by Mr. G. D. Davison of Westwick Fruit Farm, Norfolk, and introduced by Col. Petre of the same address in 1926. *Bush*: Medium in vigour, being somewhat cupped and compact in shape. Begins growth fairly late, but flowers rather early. *Trusses*: Two or three, rather short, each containing about 6 berries. *Berry*: Fairly large, skin thick and a little tough, quality good, ripens evenly but does not hang too well. *Season*: Mid-season.

A variety that requires generous manuring. It is very sensitive to lime sulphur and should not be sprayed at more than 1 per cent.

## GOLIATH

This variety is said to have been selected from **Victoria** by Mr. G. P. Berry, and introduced by Messrs. Scarlett of Edinburgh. *Bush*: Vigorous, upright, rather sparsely branched, late in leafing, flowering about mid-season. *Trusses*: Usually two, short, rather crowded on branches, each containing about six berries. *Berry*: Large, thin-skinned, sweet, ripening evenly and hanging reasonably well. *Season*: Mid-season.

Only a moderate cropper under most conditions; the short crowded truss makes picking difficult and the fruit does not travel too well on account of the thin skin. It is very sensitive to lime sulphur and should not be sprayed at more than 2 per cent.

## MENDIP CROSS

*Origin*: **Baldwin** × **Boskoop Giant**. Raised by Mr. G. T. Spinks, Long Ashton Research Station, and introduced about 1932. *Bush*: Moderate in vigour on light soils but vigorous in areas with a high rainfall, cup-shaped, producing plenty of new wood, early in leafing, flowering about mid-season. *Trusses*: One or two, each containing eight to nine berries. *Berry*: Large, slightly acid, skin thin but fairly tough, does not hang well. *Season*: Early, about the same time as Boskoop, or a day or two later.

This variety has cropped well, particularly in the west, and has become popular with some growers as an early variety. Does not thrive equally well in all areas.

## SEABROOK'S BLACK

An old variety reintroduced by W. Seabrook and Son Ltd., of Chelmsford, in 1913. Is practically identical with **French Black**. *Bush*: Vigorous, fairly compact and upright, much-branched. Comes into leaf late, and flowers

mid-season. *Trusses* : Variable from one to three, usually long, containing six or seven berries. *Berry* : Medium, very acid, skin thin and tough, travels well. *Season* : Mid-season.

A variety that is widely grown on various types of soil. A good grower, but the tendency to "running-off", particularly at the truss terminal, is a common fault, and this may account for the moderate crops obtained in some districts.

#### VICTORIA

An old variety which is said to have originated round about 1847. Almost identical with **Goliath**.

#### WELLINGTON XXX

*Origin* : **Boskoop** × **Baldwin**. Raised by Mr. R. Wellington at the East Malling Research Station in 1913 and introduced in 1927. *Bush* : Very vigorous, with a pronounced spreading habit ; it is one of the earliest to produce leaves and is early in flowering. *Trusses* : Usually one to three, medium to long, rather crowded on the branch, each containing seven or eight berries. *Berry* : Medium to large, rather sweet with a tough skin. Does not hang well. *Season* : Second-early.

This variety crops more satisfactorily under widely differing conditions than most varieties, and it can produce very heavy crops in favourable seasons. Its chief disadvantage is the spreading habit, and careful pruning must be practised to keep the bushes upright in order to prevent the fruit becoming splashed with dirt. It is rather sensitive to lime sulphur and should be sprayed at not more than 2 per cent.

#### WESTWICK CHOICE

Raised by Mr. G. D. Davison, Westwick Fruit Farm, Norfolk, and introduced by Col. Petre of the same address. *Bush* : Moderately vigorous, and fairly compact in habit, begins leafing and flowering about mid-season. *Trusses* : Usually two to three, of medium length. *Berry* : Medium to large, sub-acid, skin rather thick and tough ; fruit hangs well. *Season* : Late, coming in just after Baldwin.

A variety that is valuable for its late ripening habit, and one said to succeed where Baldwin is unsatisfactory, particularly on the heavier soils. A slightly different variety is grown under the same name. This has a leaf with much finer serrations compared with that of the true variety ; moreover it does not crop so well.

#### WESTWICK TRIUMPH

Raised by Mr. G. D. Davison and introduced by Col. Petre. *Bush* : Vigorous, a stronger grower than **Davison's Eight**, rather spreading in habit. Fairly late in leafing and flowers early to mid-season. *Trusses* : Normally only one of medium length, carrying seven to eight berries. *Berry* : Medium with a thin but tough skin, hangs and travels well. *Season* : Mid-season.

The rather spreading habit of the bush is a disadvantage, also the variety is very liable to lime sulphur damage.



## VARIETIES IN ORDER OF RIPENING

* Boskoop Giant	...	...	...	...	...	...	...	...	...	} Earliest
* Mendip Cross	...	...	...	...	...	...	...	...	...	} Early-mid
* Wellington XXX	...	...	...	...	...	...	...	...	...	}
Blacksmith (Laxton's)	...	...	...	...	...	...	...	...	...	}
Davison's Eight	...	...	...	...	...	...	...	...	...	}
Goliath	...	...	...	...	...	...	...	...	...	} Mid
* Seabrook's Black	...	...	...	...	...	...	...	...	...	}
Victoria	...	...	...	...	...	...	...	...	...	}
Westwick Triumph	...	...	...	...	...	...	...	...	...	}
* Baldwin	...	...	...	...	...	...	...	...	...	} Late
Cotswold Cross	...	...	...	...	...	...	...	...	...	}
* Hilltop Baldwin	...	...	...	...	...	...	...	...	...	}
* Westwick Choice	...	...	...	...	...	...	...	...	...	} Latest
Daniels's September	...	...	...	...	...	...	...	...	...	}

\* Most widely grown.

## PROPAGATION AND PLANTING MATERIAL

Black currant bushes for planting should be well grown, true to name and free from disease. Usually they are propagated from hard-wood cuttings, which root readily—so readily indeed that it may lead to careless management and preparation of the cutting bed, resulting in weedy plants which do not thrive when planted out.

Cuttings should be taken from well grown bushes which have been officially certified in the previous summer. On poor land where it may be difficult to find stout young wood, it may be advisable to grow stools for the purpose of producing such material. Stools are developed by cutting back all growths in the dormant season. This encourages the formation of new, vigorous growths of one-year-old wood suitable for cuttings. No shoots should be left on the parent plant for a second year. If this is done, it is important not to keep the stools too long, otherwise they will tend to produce rank growth with few buds. Although certification provides evidence that the bushes or plants have been properly rogued and are free from Reversion, it cannot ensure that the bushes are free from the almost invisible Black Currant Gall mite. The best precaution against the latter is to take cuttings only from bushes or plants that have been grown in isolation and regularly sprayed to control this pest. The growing cuttings should be sprayed also.

The best wood for cuttings is the basal part of strong well-grown yearling shoots, though almost any part, except the soft tip, will make a good cutting. When taken, the wood should be cut into 8- or 10-in. lengths and planted at once before it has time to lose moisture. The depth of planting should be such as to leave about two buds above the soil level. Alternatively, the full-length shoots are pushed down to a depth of 6 to 8 in. into well prepared soil, the tops afterwards being cut down with secateurs to within two buds of the soil.

The time of taking and planting the cuttings is important. Autumn planting (October or early November) gives the best results. There is evidence that woody cuttings, before they become dormant and still retaining some green leaves, root better than dormant, leafless cuttings. At that time, too, the land is warmer, and a better root and much better subsequent growth result. Any soil that is not too heavy is suitable for nursery beds, but gritty soils give the best results. The land should be well prepared, the



most suitable preparation depending on the type of soil, and it should be in good condition. If they are to stand for one year only and horse cultivation is practised, the cuttings should be planted in rows spaced a minimum distance of 27 in. If they are to stand for two years 36 in. is a better spacing for the rows. The cuttings should on no account be spaced less than 6 in. in the rows. The common nursery practice of planting the cuttings 2 or 3 in. apart in rows spaced 2 ft. apart is quite unsuitable for plants that are to stand for two years. Besides resulting in poor growth, such close planting makes inspection for certification extremely difficult if not impossible, many plants being concealed by their neighbours.

Whatever method of planting is used, it is important that the soil should be made firm around the base of the cutting. If the cuttings are lifted by frost they should be pushed down and the soil made firm again before the spring. Spring and summer cultivations will be required, and it is important that there shall be no weeds in the cutting bed in May and June.

At the end of the first year the bushes should be cut down to within one or two buds from ground level to ensure that new growth comes from or just below ground level. This cutting down is essential if the bushes are to be certified, but it is not recommended if the one-year-old bushes are either very strong or very weak. If very strong, too much growth results after cutting back, causing over-crowding in the row (unless the plants are spaced about one foot apart), and it is preferable to use such bushes for planting out as maidens. If very weak, they should be destroyed because such bushes cannot come up to the requisite standard for certification, even if heavily manured in their second year.

Whether one- or two-year bushes should be used for planting depends on circumstances. Although it is true that the younger the bush the more quickly it becomes established after planting out and the better it grows, the risk of infection by Reversion must be taken into consideration. Two-year-old bushes are planted out only a few months after certification and so run little risk of being infected. Maiden bushes (one-year-olds), however, are not suitable for effective roguing before planting out and, therefore, are not themselves officially inspected for certification; moreover, almost eighteen months will have elapsed since the parent bushes were inspected. However, if the cuttings have been grown in adequate isolation, and have been sprayed against Black Currant Gall mite, the risk of infection is small and such maidens, if well grown, are excellent for planting. If these precautions have not been taken, the risk of infection is considerable and good two-year-old bushes that have been certified are much to be preferred. If the production of maidens is planned, special care in the selection of the bushes from which to take cuttings is necessary.

## **PLANNING AND PLANTING**

### **Preparation of Land for Planting**

Whenever possible the land should be in good heart before planting, and where poor arable land is to be used, efforts should be made to raise the content of organic matter by ploughing in green crops or establishing a short-term ley.



Planting should not be carried out on land that is foul with perennial weeds, such as convolvulus, thistle, dock and couch grass. If necessary, a summer fallow should be given, or a cleaning crop such as potatoes or mangolds should be grown.

Where grassland is to be broken up, it is best disced in late summer so that the turf can be dried out and the grass killed before ploughing. Final preparation of the land, consisting of discing and harrowing, should be completed before planting the bushes in late autumn or early spring.

Except where grassland has been ploughed out for the plantation it is advantageous to give the land a generous dressing of farmyard manure before planting, because the black currant benefits both from the nitrogen supplied and from the increased retention of soil moisture made possible by the addition of organic matter.

### Planting Plan

Planting systems vary in different parts of the country, but two main systems are :

#### (a) Square planting

#### (b) Hedge planting

Generally the scarcity and cost of hand labour has been responsible for square planting becoming less popular. Where extensive areas of land are available, the bushes can be planted 10 ft. square, and cultivation and spraying is then carried out by tractor. Crop weights per acre will, however, be light in the first few years owing to the comparatively small number of bushes per acre. With such wide planting it is even more important than usual to keep the bushes free from Reversion so that they may have a long life after they attain full size and cropping condition.

The alternative to square planting is the hedge system, which is very popular and probably the best system for small acreages. By having the rows with sufficient width between for the implements to be used, and by planting closely in the rows, one-way mechanical cultivations are possible throughout the life of a plantation (see Plate VI). The high number of bushes per acre can increase the crop returns appreciably, at least for the first years of cropping.

Horse cultivators may be useful in blackcurrant growing, and rows 8 ft. apart can be managed successfully with their use. "Walk-behind" motor cultivators can operate between 8-ft. rows also, but any wheeled tractor needs at least 10-ft. alleys to allow for cultivations and to avoid wheel damage to the bushes' outside branches. The planting distance in the row has been as little as 3 ft. with the 10-ft. row spacing and 4 ft. in the 8-ft. spacing. The former needs 1,452 bushes per acre, and the latter 1,361 bushes. A 10-ft. alley allows the use of a mobile spraying outfit, but any closer spacing limits the choice of machinery. If a mobile machine cannot be used for spraying, the hoses have to be dragged between the rows from the headland. As a 90-ft. length of hose is sufficient for one man to manage on arable soil, the length of the rows should not exceed 180 ft. without provision of cross roads ; the latter can be provided at planting time by omitting three consecutive bushes in the row at suitable intervals.



## **Planting**

Cuttings, maidens or two-year-old plants may be planted, depending upon growth conditions. Cuttings may be planted in their permanent positions on light land that possesses a good moisture status. Under these conditions the plants grow away quickly and it is found that at the end of three seasons the bushes will be larger than if maidens or two-year-old bushes had been planted. On many of the medium-to-light soils, maiden bushes will grow away better than two-year-olds, especially if they are strong and are planted in November. On the medium-to-heavy and heavy soils, however, where rooting does not occur so readily, two-year bushes give the best results. Planting can be done any time during the winter when the soil is not too wet, but the best growth is likely to result if the planting is done in the late autumn. Planting should not be attempted in frosty weather. When maidens or two-year-old bushes are planted, it is advisable to set them rather deeply, so that some of the young wood, carrying strong buds, is below ground level. On no account should bushes be planted so that a length of stem is left between soil level and branches.

The land should be marked out beforehand ; with "hedgerow" planting it is necessary only to mark off the rows along the headlands and to plant with the aid of a tagged wire stretched between opposite pegs, setting a bush at each tag.

Large scale planting operations are made easier if a single, deep furrow is ploughed out along each row position and the bushes planted at correct distances along it. It is important to align rows and plants accurately so that cross-cultivations, which should be very shallow, are possible during the first year at least.

## **Tillage Operations**

Black currant bushes produce masses of fine roots just below the soil surface, which are easily damaged by tillage operations. All cultivations, except those before planting, should be fairly shallow and sufficiently often to kill weeds only. If the soil concerned requires deep cultivation, this should be carried out very thoroughly before planting, because it cannot be done afterwards without detriment to the growth of the bushes. In the first year after planting it should be possible to carry out work with horse-drawn hoes or shims in both directions for at least one season, possibly two. While the bushes are young, cultivations may be slightly deeper in the middles of the alleys, away from the spread of the roots. As this space will gradually lessen, owing to spread of the roots, the deeper cultivations should cease before the roots meet across the rows. Hand-hoeing of bushes close-planted in the rows will be necessary until a continuous hedge is formed the complete length of the row. It is desirable that a heavy type of push-hoe should be used rather than a draw-hoe, because the latter may pull the soil away from the bushes instead of slightly working it towards the stems.

After the first one or two years, tillage operations can be done effectively only in one direction between the rows where the "hedge" system of planting is adopted. Horse-drawn implements, such as spring-tined cultivators and shims, can work fairly close to the bushes, but should be set to work as shallow as possible. It is especially important that implements drawn by a tractor



should be set for shallow work ; the use of discs, which can easily cut off numbers of fine surface roots, is not advisable. Hand-hoeing in the rows will usually be required twice in the spring and once in the autumn. If, however, the only weeds in the autumn are groundsel and chickweed it is usually possible to omit the autumn hoeing and rely on the winter wash to kill them off.

In the summer all cultivations should cease for a time as soon as the branches of the bushes begin to fall outwards with the weight of fruit. Ploughing between the rows of bushes during the winter, even if shallowly done, is not advisable and should be dispensed with unless the weeds have secured the upper hand. On some soils, light surface scuffling may take the place of the winter ploughing. If possible, both pruning and winter spraying should be completed before the winter ploughing or scuffling is done.

### Manuring

Black currants respond to a high level of manuring, but as soil moisture is of the utmost importance the basis of a sound manurial programme should be farmyard manure or some other bulky source of organic matter. Unless regular dressings of bulky organic manure are given the crop is likely to suffer in a dry summer, especially on light land. These dressings, whether of farmyard, stable or other natural manure, compost, or straw rotted with a nitrogenous fertilizer, should be given as a mulch in winter (before ploughing if this is done).

Farmyard manure, or compost, for ploughing-in should be spread along the rows in winter to a width that will cover the roots. A single shallow furrow should then be turned on to it from each side.

Surface mulching is a satisfactory method of providing for several of the requirements of the black currant. It is valuable not only for the plant nutrients it supplies but also for maintaining the soil in a moist condition. If the surface mulching is sufficiently thick it smothers the growth of annual weeds, so making cultivation unnecessary and avoiding the risk of root damage. Straw used as mulch may be spread over the entire surface of the soil, and sulphate of ammonia broadcast over it at the rate of 1 cwt. per ton of straw to assist rotting. At the first application as much as 4 tons of straw per acre may be needed. There is, however, one drawback to the use of mulch, particularly straw, for in dry weather there is a risk of fire occurring, especially if the plantation is adjacent to a railway. When using a straw mulch, therefore, this risk should be borne in mind.

In addition to manuring of this kind, a generous application of fertilizers is necessary. The amount of nitrogen that should be given either in the form of sulphate of ammonia, or another fertilizer, varies considerably according to the nature of the soil, the varieties, the growth the bushes have made and the kind of winter mulch given. It should be applied in February or preferably just before the first spring cultivation is given ; in some districts a further dressing is given in August. Regular dressings of phosphates and potash are also required and these may be applied at any convenient time during the winter or with the spring application of nitrogen. If the potash is applied in the form of muriate of potash it is safer to apply it during the October-November period so that the impurities may be washed out during the winter.



A suggested annual dressing of fertilizer is sulphate of ammonia (or equivalent) 4 to 6 cwt. per acre, superphosphate (18 per cent  $P_2O_5$ ) 3 to 4 cwt. per acre and muriate of potash 1 cwt. per acre. The higher rates should be applied when bulky manures are not given. It should be noted that results from fertilizers only are likely to be poorer than when bulky manures also are applied.

## Pruning

Newly planted bushes should be cut down to within one or two buds of ground level before growth begins. This initial hard pruning is necessary to ensure that all new shoots arise from below or close to ground level to give the type of bush required. At the end of the first season, bushes planted as two-year-olds or strong maidens should have made three or more vigorous new shoots at least 18 in. to 2 ft. long, and these may be left unpruned and allowed to fruit in the following year. Some growers cut down to ground level one of these strong shoots in each bush. Bushes which have made only one or two shoots, or bear only weak shoots, should be cut down again to ground level.

The best fruit-bearing parts of the black currant bush are the young shoots produced during the previous growing season ; older wood bears less heavily and produces fruit of lower quality. The aim of pruning fruiting bushes, therefore, is to remove the older growth in favour of the younger wood. There is a very great difference in the severity of the pruning considered necessary for this purpose in different areas and on different soils. Under the best conditions of growth, where generous annual dressings of farmyard manure are given, an abundant supply of young wood is produced for several years without any pruning other than cutting down the bushes after planting. In such circumstances the effect of pruning would be merely to reduce the amount of cropping wood and so lower the crop. As growth slows up, however, a fairly heavy pruning is given to "keep the bushes going." This consists of cutting back some of the older branches to strong growths fairly low down, or, if there are no such growths, cutting them right back to point of origin or to ground level. If manuring is adequate little further pruning is necessary for another two or three years.

Under less favourable conditions a certain amount of pruning is needed each year to ensure an adequate production of young growth. One method in the second winter after planting is to cut all shoots that have fruited, either to strong growing laterals or close to the base, or at ground level. Pruning in later years would aim at stimulating renewal of young wood by an annual cutting out of the older branches. It is maintained by some that no wood above ground level should be more than three years old, and that removal each year of about one-third of the bush, cutting out the oldest wood close to the base, should achieve this objective.

Hard pruning may lower crop yields, and it is highly desirable to encourage the production of young wood by adequate manuring and efficient tillage and not by pruning only. Basal cuts should be made as low as possible to avoid creating snags of dead wood, which hamper the development of new shoots and harbour pests. Overcrowding at the base of the bushes results in fewer basal shoots ; higher up in the bush it may result in uneven ripening and slow picking. Very low horizontal branches may interfere with cultivation and should be removed.

## PEST AND DISEASE CONTROL

The methods of controlling pests and diseases include spraying in winter and spring, and "roguing" in June. A routine spraying programme is necessary to control the common pests, but it will require modification owing to the local occurrence of individual pests. The usual programme consists of a winter application of tar oil to control aphids, and to application of lime sulphur at the "grape" stage to control Black Currant Gall mite (Advisory Leaflet No. 27\*). If, however, caterpillars or Capsid bugs are likely to be troublesome, DNC may be substituted for the tar oil. DDT may be added to the lime sulphur to control caterpillars, Capsid bugs (Advisory Leaflet No. 154), and Black Currant Leaf midge, and in plantations where Black Currant Leaf midge has become a serious pest, extra applications of DDT may be necessary, but parathion, used when the first signs of midge attack appear, probably gives a much better control.†

In some districts or seasons the diseases Cluster Cup Rust and Leaf Spot are severe on certain varieties. Satisfactory control of both diseases can be obtained with a 8:8:100 Bordeaux Mixture (i.e. one containing 8 lb. copper sulphate and 8 lb. hydrated lime in 100 gal. water). An application can be made in May or June but it is not generally recommended except on young nursery bushes because it may render the fruit unsaleable. A later application, immediately after the fruit is picked, will check infection of the younger leaves and arrest defoliation. If this late spray is omitted it may be necessary to spray early the next year, as soon as the fruit is set, in order to save the crop. Wherever practicable, fallen leaves from bushes affected with Leaf Spot should be raked up and buried before the new leaves appear in the spring.

The usual method of applying sprays is through rubber hoses with very short lances fitted with triple nozzles (No. 4 discs). The hoses are pulled along between the bushes, the operator spraying up one side of an alley and down the other. In order to supply two triple nozzles with No. 4 discs, the spray pump should have a capacity of not less than 10 gal. per minute.

"Automatic" spraying is likely to prove satisfactory if the bushes are widely spaced and the spraying machine is big enough. For spraying young bushes three or four nozzles each side of the machine fitted with No. 4 discs may suffice, but for well grown bushes six or eight such nozzles each side may be needed to give adequate cover. As each nozzle will have an output of at least  $1\frac{1}{4}$  gal. per minute, even at a pressure of 300 lb. per square inch, it will be noted that the spray pump should have a capacity of a full 20 gal. per minute in order to keep the nozzles on both sides of the machine supplied.

Even in the best plantations at least some bushes affected with the virus disease Reversion are likely to be present, and therefore roguing should be carried out every year. It is only in very carefully rogued plantations that the number of affected bushes is likely to be as low as 1 per 1000. It is a simple matter to recognize Reversion when the symptoms are pronounced,

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\* See footnote, p. 19.

† Special precautions must be taken when using parathion



but it requires practice to detect it in the early stages (see Plate VII). It is most important, however, to remove bushes when first affected to avoid the risk of the disease spreading (see Advisory Leaflet No. 277). The leaves on which the symptoms are most readily detected are formed in June. In the latter half of June these leaves are near the top of the growth where they can readily be recognized by anyone who has had experience in looking for them. If examination is delayed until July the leaves showing symptoms are overhung by leaves that appear normal and are therefore likely to be missed. Examination for Reversion should therefore be made in June, especially the latter half, and attention should be directed particularly to the fully expanded leaves near the tops of well grown leading shoots. In Reverted bushes the shape and texture of these leaves is abnormal. When in doubt, the simplest test is to count the number of veins proceeding from the mid-rib to the outer edge of the centre lobe and terminating there in a serration.



Fig. 1. REVERSION IN BLACK CURRANT LEAVES

Progressive stages of the disease, from a normal leaf (1) to the oak-leaved form (7). The main veins terminate at A, B, C, D, E, and the sub-main veins, which spring from that terminating at C and are the important ones for purposes of identification, are indicated by numbers.

If there are five or more of these veins on each side, the leaf is healthy ; if only four it is unhealthy (Fig. 1). Frequently, varieties in the French Group form one leaf with five veins on one side and four on the other, but such a leaf does not indicate the existence of Reversion. Leaves having a reverted appearance may form on healthy bushes in May or July, or on lateral growths at any time. This is common in the *Goliath* group and usually is caused by injury or by forked growth. Therefore, it is very important to make the inspection in June. Reverted bushes should be grubbed out immediately they are detected, and burned.

## HARVESTING AND MARKETING

Black currants should be picked when they are well coloured and ripe but still firm. With *Boskoop* and other varieties that ripen unevenly, there should be a green or red berry at the end of the bunch, for by the time this berry is coloured black the remainder will be overripe. Although picking should always be delayed until the fruit is as ripe as possible, it is important to begin in time to allow the available labour to clear the crop before it becomes overripe. For the processing factories, picking may be done slightly later, for slightly overripe fruit is no disadvantage provided it is sound.

Usually, the berries are picked "on the strig", i.e., in intact bunches. For the chip trade it is important that the berries should be picked when dry, and pickers should not be allowed to include squashed berries. The whole crop is cleared at one picking. Although, probably, piecework is more usual, some growers prefer to pay time rates for picking.

## MACHINERY AND TOOLS FOR PLANTATIONS

Although cultivation of black currants involves the use of comparatively few implements, those used should be of a light type. As already mentioned, push-hoes are better than draw-hoes, for their use helps to maintain the soil around the bushes instead of drawing it away. For horse work a light plough may be used while the bushes are young. If the plough is "offset" great care is needed to see that roots are not damaged. Probably, it is safer not to use the offset plough but to see that the outer edge of the share runs nearly out of the ground when the first furrow is turned towards the bushes. The most useful tool is the spring-tined cultivator. If used often enough, little else in the way of implement working is needed. Many fruit-growers use a shim for weed cutting ; of this type of tool there are numerous local variants. One type, for example, has a wide central "V" tine, which is set rather deeply, with a wide "L" tine on each side set so as to slope upwards towards the bushes, so that the outer edge runs nearly out of the ground. Horse tackle may consist of bell ropes or breeching tackle ; chains covered in hose pipe may also be used. Naked chains can do considerable damage to the branches of the bushes and should not be used.

Implements for use with an ordinary farm tractor need to be chosen with great care. It is doubtful whether any form of plough should be used



at all after the first year. In wide rows light disc harrows are used, but with these it is not possible to run very close to the bushes, and they should be set deeper in the middle than at the sides. Special guards are needed to prevent the wheels driving the branches down into the soil and the harrows from tearing off the branches. Spring-tined harrows are useful ; with these it is advisable for a man to walk behind to guide them as required.

Usually, the spraying machine will be one that has other uses on the farm. Although it is possible to do good work with a  $2\frac{1}{2}$ -h.p. 5-gal.-per-minute machine, it is more laborious than a horse-drawn 10-gal.-per-minute machine with 100-gallon tank, or machines of larger size.

# THE PROPAGATION OF BLACK CURRANTS



SHOOTS FOR CUTTINGS BEING TAKEN  
FROM A STOOL

*[Photos: Long Ashton Research Station]*

MAKING THE CUTTINGS FROM THE  
SHOOTS TAKEN FROM THE STOOLS





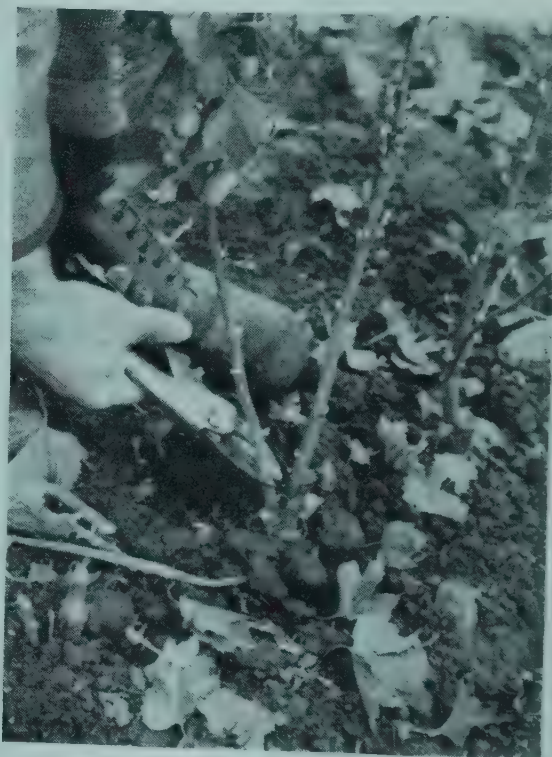
## THE PROPAGATION OF BLACK CURRANTS



SHOOTS TAKEN FROM THE STOOL MAY BE PLANTED  
AND SUBSEQUENTLY CUT DOWN

The wood removed is used for additional cutting

ONE-YEAR-OLD BUSH CUT DOWN TO OBTAIN  
SATISFACTORY BASAL GROWTH FOR TWO-YEAR-OLD  
BUSH

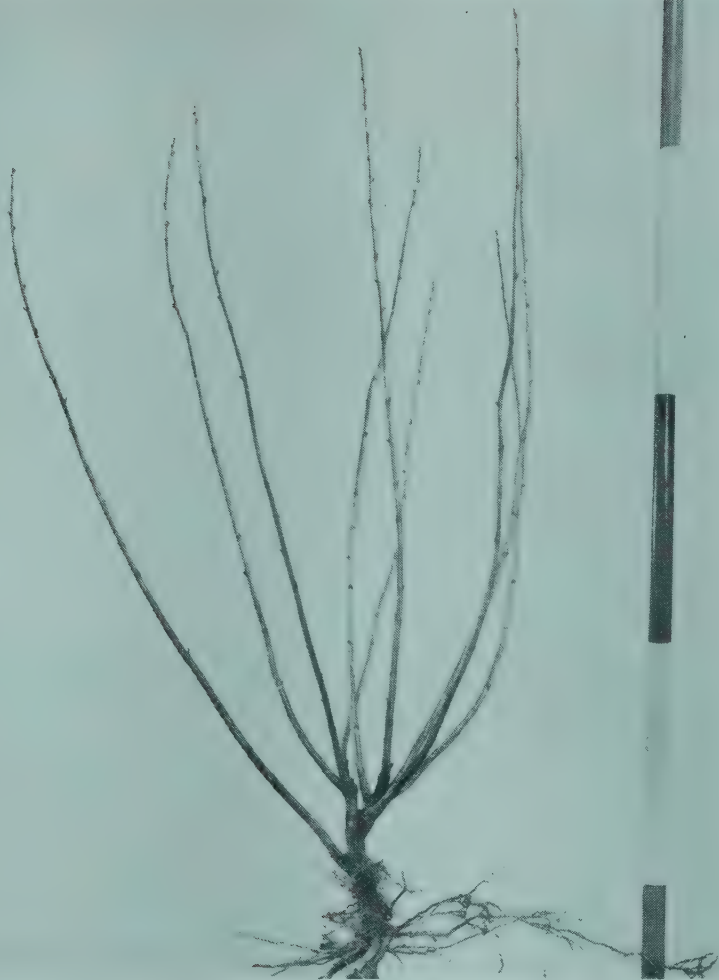


*[Photos: Long Ashton Research Station]*



TWO-YEAR-OLD BUSH WITH STRONG BASAL  
GROWTHS AND NO "LEG" READY FOR PLANTING OUT





[Photo : Long Ashton Research Station]  
TWO-YEAR-OLD BLACK CURRANT BUSH SUITABLE FOR PLANTING



NURSERY PLANTATION OF ONE-YEAR-OLD BLACK CURRANT BUSHES  
PLATE III





ROGUING TWO-YEAR-OLD BLACK CURRANT BUSHES IN THE NURSERY PLANTATION



[Photo: Long Ashton Research Station]  
 BLACK CURRANT BUSH FIVE YEARS FROM PLANTING, BEFORE PRUNING  
 Variety: *Cotswold Cross*





THE BUSH SHOWN IN PLATE IV, AFTER PRUNING



[Photos: Long Ashton Research Station  
MULCHING BLACK CURRANTS  
Applying the manure from a tractor-hauled trailer  
PLATE V





WHEELED TRACTOR CULTIVATING 10-FT. ALLEYS BETWEEN BLACK CURRANTS



*Photos: Long Ashton Research Station*

HORSE-DRAWN AND TRACTOR-DRAWN CULTIVATORS ARE SUITABLE FOR CLOSELY PLANTED BLACK CURRANTS



REVERSION IN BLACK CURRANTS  
Growth on left is affected; growth  
on right is normal



*[Photos : East Malling Research Station]*



“GRAPE” STAGE OF BLACK  
CURRANTS  
Black currants should be sprayed at  
this stage with sulphur lime to  
control Gall Mite

PLATE VII



# THE PROPAGATION OF GOOSEBERRIES



CUTTINGS PREPARED FOR PLANTING, SHOWING  
DISBUDDING TO FORM LEG BUSHES

CUTTINGS PLANTED SHOWING STRAIGHT-SIDED  
TRENCH AND DEPTH OF PLANTING



[Photos : Royal Horticultural Society]



ROOTED CUTTING OR ONE-YEAR-OLD BUSH SUITABLE  
FOR PLANTING

# THE PRUNING OF GOOSEBERRIES

ONE-YEAR-OLD BUSH  
PRUNED



[Photos : *Royal Horticultural Society*]



TWO-YEAR-OLD BUSH  
SHOWING GROWTH MADE  
FROM THE ORIGINAL  
PRUNING



# THE PRUNING OF GOOSEBERRIES



BRANCH OF FULLY DEVELOPED BUSH, UNPRUNED



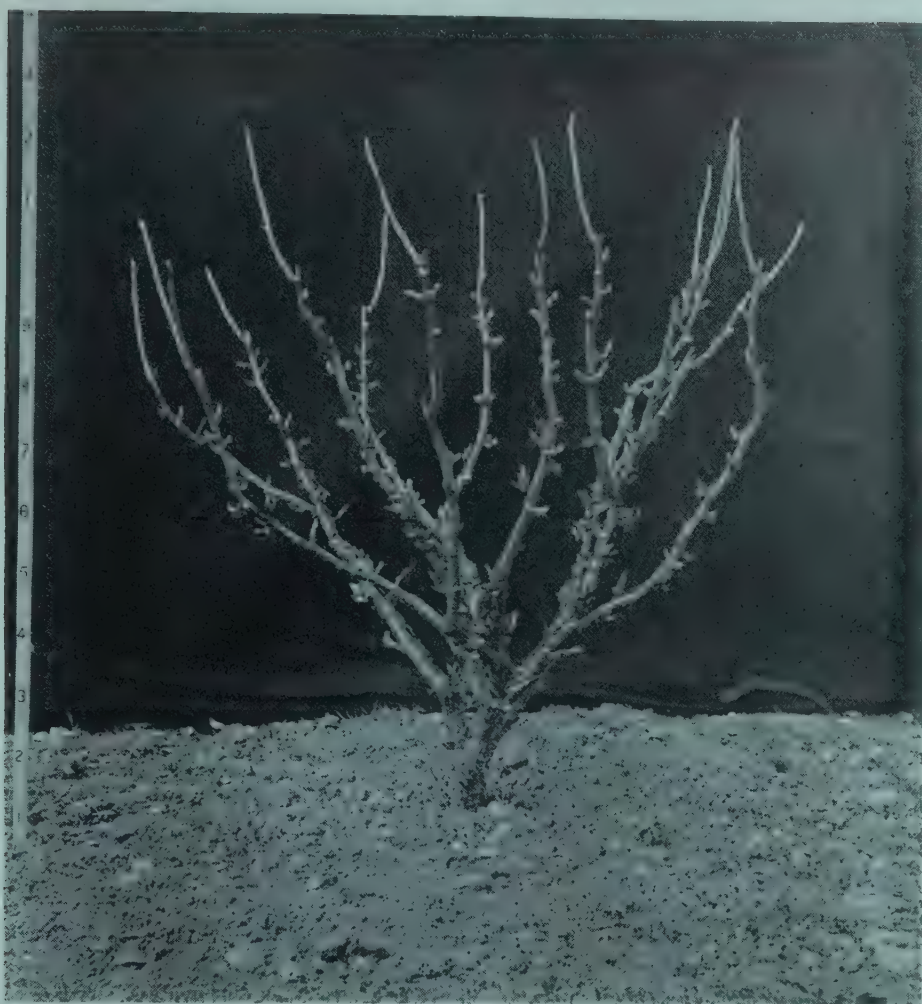
BRANCH OF DEVELOPED BUSH, PRUNED



FRUITING BRANCH OF DEVELOPED BUSH WHEN CORRECTLY PRUNED

[Photos: Royal Horticultural Society]

# THE PRUNING OF RED CURRANTS



PRUNED BUSH



[Photos East Malling Research Station  
UNPRUNED BUSH



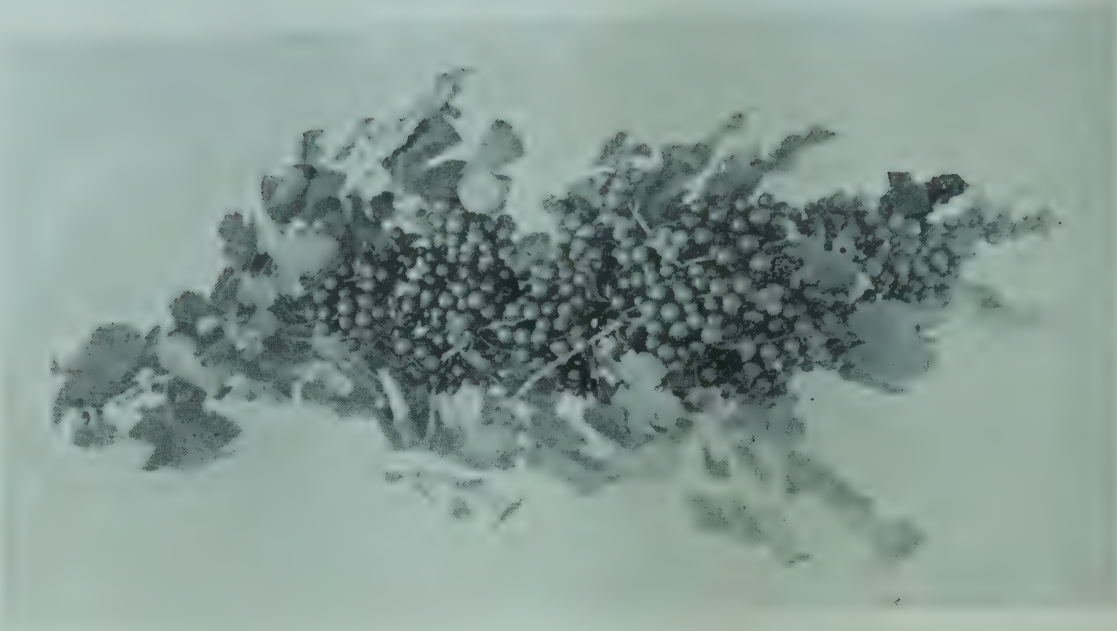
# THE PRUNING OF RED CURRANTS



BRANCH OF DEVELOPED BUSH, PRUNED



[Photos: Royal Horticultural Society]  
BRANCH OF DEVELOPED BUSH, UNPRUNED



FRUITING BRANCH OF DEVELOPED BUSH  
CORRECTLY PRUNED  
Variety: *Red Lake*

## RED CURRANTS

The demand for red currants is more limited than that for black currants. The recorded acreage of red currants in England and Wales for 1939 was 2,300 acres, of which approximately 900 were in Kent, the remainder being mainly in Worcestershire, Norfolk, the Isle of Ely and Cambridgeshire. In 1946 only 1,500 acres were recorded with a similar figure for 1947 and 1948. In 1949 the total acreage was 1,699 and in 1952, 1,400. Import figures are included with those for black currants and are not differentiated, but are believed to be comparatively unimportant.

Red currants can be grown on soils having a wide range of texture, but usually their commercial culture is confined to the lighter soils. They thrive best on well drained soils of fair depth that do not readily dry out and are not deficient in potash. In Kent the largest acreages occur on soils derived from the Thanet Beds and on brickearths. The bushes are less tolerant of poor drainage than are those of black currants. Slightly acid or almost neutral soils are most suitable though susceptibility to lime-induced chlorosis is not marked. Shoots of the red currant are easily "blown out" by winds, especially of the varieties *Fay's Prolific* and *Laxton's Perfection*. Windswept situations are not so suitable for red currant plantations, and a site that affords some protection from strong winds is to be preferred.

Cuttings are prepared in a similar manner to those of the gooseberry when grown as single-stem bushes, the bushes of red currant being invariably grown on a clear "leg". Usually 2-year bushes are planted, and at 5 ft. square; preferably the plantation should be in the open, though the bushes may be grown under tree fruits.

### DESCRIPTIVE NOTES ON VARIETIES

The cultivated varieties of red currant are derived from four species of *Ribes*. Of the numerous varieties, seven have achieved popularity with the commercial grower; of these, the most widely planted is undoubtedly *Laxton's No. 1*. The most widely grown are indicated by heavy type.

#### **Laxton's No. 1**

*Bush* : Vigorous, upright to slightly spreading. *Truss* : Moderately long, much bunched. *Berry* : Medium, bright red, seed small. *Quality* : Good. *Season* : Early. This comparatively new introduction has done well in the National Fruit Trials and now forms the bulk of new plantations. It is a very heavy cropper and not subject to "blowing out". Suitable for canning.

#### EARLIEST OF FOURLANDS

*Bush* : Vigorous, upright. *Truss* : Moderately long, much bunched. *Berry* : Medium to moderately large, bright red, seed small. *Quality* : Good. *Season* : Early, ripening just before *Laxton's No. 1*.



### FAY'S PROLIFIC

*Bush* : Moderately vigorous, fairly upright. *Truss* : Long, moderately free, hanging loose. *Berry* : Large to very large, deep red. *Quality* : Good. *Season* : Early. Tends to produce a percentage of blind shoots, a habit which makes it difficult to form a good bush ; the branches are brittle. Rather susceptible to frost damage. It was fairly widely planted in the past, particularly on account of its earliness and large attractive berry, but has lost popularity on account of the blind-shoot habit.

### LAXTON'S PERFECTION

*Bush* : Vigorous, upright, growth very stout. *Truss* : Long to very long, fairly free. *Berry* : Very large, held laxly, of good colour. *Quality* : Good. *Season* : Mid-season. This is a good variety for canning and quite a good cropper but it has gone out of favour owing to the production of a percentage of blind buds and to a substantial number of the shoots "blowing out".

### RABY CASTLE

*Bush* : Moderately vigorous, upright. *Truss* : Medium length, moderately loose. *Berry* : Medium, bright red, maintains its colour after picking. *Quality* : Good. *Season* : Mid- to late. Rather susceptible to frost damage and many existing stocks are mixed. Suitable for canning.

### RED LAKE

*Bush* : Moderately vigorous, upright. *Truss* : Very long, free, with basal berry not interfering with picking. *Berry* : Very large and of even size ; bright red, juicy ; seeds moderately large. *Quality* : Good. *Season* : Mid- to late. Apparently shows no tendency to blow out. An outstanding new North American variety with a very free cropping character, producing a remarkably long truss of evenly shaped attractive fruit. Introduced by the University of Minnesota fruit-breeding farm. Parentage unknown.

### Wilson's Long Bunch

*Bush* : Moderately vigorous, semi-erect. *Truss* : Medium length, rather bunched. *Berry* : Medium, bright red. *Quality* : Good. *Season* : Late. A very free cropping variety which is valuable on account of its lateness. There are several different stocks distributed under the name "Wilson's Long Bunch" but the true stock is a distinct variety and can be distinguished generally by its late-ripening habit.

## MANAGEMENT

As with other bush fruit plantations, clean cultivation is essential for red currants. Manuring is on similar lines to those for gooseberries, though usually at a lower level, farmyard manure being more sparingly used. Potash is very important but the bushes are rather slower to show a response than those of gooseberries. The bushes are the most sensitive of the fruit plants to injury from chloride-containing fertilizers (see p. 28). The nitrogen supply should not be excessive, especially where the bushes are vigorous. Inorganic fertilizers produce a good yield. Red currants are not particularly susceptible to trace element deficiencies.

Meat-and-bone meal at about 6 cwt. per acre, or sulphate of ammonia and superphosphate each at 2-3 cwt. per acre, may be used (in addition to

such potash as is obtainable (see p. 28)) when no farmyard manure is available. A mulch of farmyard manure in the spring, 2 or 3 forkfuls per bush, is advantageous, especially on dry soils.

Red currants fruit mainly on spurs on the older wood and not on the previous year's wood as with the black currant. Almost invariably winter pruning is on the "spur-pruning" system. At the beginning about eight main branches are obtained, evenly spaced to give an open-centre bush. Young bushes are cut back hard in the winter of planting, and one or two more hard winter prunings are needed to produce the open bush with the chosen number of well-spaced branches. Leaders are tipped each year by half, or more if weak, and other shoots are shortened to about  $\frac{1}{2}$  or  $\frac{3}{4}$  in. or removed completely if very strong.

Summer pruning is not often practised commercially, though it may be very useful in promoting evenness of ripening and in checking somewhat over-vigorous growth. All shoots except the leaders are cut back to about 4 in. in length, to be further shortened to about  $\frac{1}{2}$  to  $\frac{3}{4}$  in. This summer pruning is carried out as the fruit begins to gain colour.

### **PICKING AND MARKETING**

The crop is picked, usually in one operation, into chip baskets, but generally for the preserving trade the fruit is despatched in shallow trays. It is desirable to pick red currants "on the strig" in order to avoid injury to the berries. A yield of three tons per acre is regarded as a good crop.

### **PEST AND DISEASE CONTROL**

Normally, the only routine spraying given to red currants is a winter application of tar oil at 5 per cent strength to prevent attacks by aphids. Sometimes Gooseberry sawfly (Advisory Leaflet No. 30\*), Magpie moth (Advisory Leaflet No. 65), Common Green Capsid bug (Advisory Leaflet No. 154), and Winter moth caterpillars (Advisory Leaflet No. 11) attack the red currant in addition to the gooseberry. American Gooseberry Mildew (Advisory Leaflet No. 273) and Cluster Cup Rust (Advisory Leaflet No. 198) may also occur on red currants, but less frequently and usually less seriously than on gooseberries.

The fungi causing Coral Spot (Advisory Leaflet No. 23) and Black Pustule diseases produce respectively coral-red and black spore-bearing pustules on branches of red currant which they have killed; these branches should be cut out and burned. The Black Currant Gall mite (Advisory Leaflet No. 27) may attack the red currant, though the buds do not become notably enlarged. Die-Back (Advisory Leaflet No. 204) also affects red currants as well as gooseberries.

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\* Single copies of Advisory Leaflets are obtainable free (up to six leaflets) from the Ministry of Agriculture (Publications), 36, Chester Terrace, Regent's Park, London, N.W.1. Copies beyond six may be purchased from the Sales Offices of H.M. Stationery Office (see cover p. iv) or through any bookseller, price 2d. (3½d. by post).



## GOOSEBERRIES

The gooseberry is the first of the hardy fruits of the year to yield produce ; in the earliest districts the young green berries are picked from the latter half of April onwards.

Green gooseberries are used for various purposes, e.g. tarts, pies and jam as well as for canning ; the ripe fruit is used for dessert purposes.

The area of bushes grown commercially in England was estimated in 1929 to be 18,800 acres, declining to 10,400 acres in 1936. Acreage returns, which showed a continued decline, were 9,100 in 1939 and 5,500 in 1946. The return for 1947, 6,000 acres, showed a slight recovery which has been maintained, the return for 1948 being 6,100 acres, 6,500 acres in 1949 and 7,000 in 1952. Thus, as with other soft fruits, there was a steady decline in cultivation both before and during the recent war years. Some responsibility for the decline has been attributed to the fact that the use of gooseberries as a source of pectin for jam-making has been superseded by commercial pectin which originates as a by-product from U.S.A. citrus-processing factories.

Imports of gooseberries before the war, mainly from Holland, averaged nearly 12,000 cwt. annually from 1931 to 1938 inclusive. Production in England increased from 479,200 cwt. in 1933 to 561,800 cwt. (42·7 cwt. per acre) in 1934, although the heavy frosts of 1944 brought down the average yield to 28·5 cwt. per acre in that year.

The principal areas of production are Kent and the area around Wisbech comprising West Norfolk, the Isle of Ely and parts of the Holland Division of Lincolnshire. Worcestershire, Hampshire, Cheshire, Lancashire and Cornwall all contain appreciable acreages of gooseberries, ranging from about 500 down to about 80 acres.

Growers in the Tamar Valley area of Devon specialize in the production of early green gooseberries, and those in the Chailey area of East Sussex specialize in growing ripe fruit of the variety *Leveller* for dessert purposes.

Supplies of bushes of the most popular commercial varieties have been limited in recent years.

Gooseberries may be grown separately from any other fruit or as an inter-crop under top-fruit trees. In the Wisbech district where most of the gooseberry acreage is under top fruit, a fruit-soil survey of that area in 1929 recorded only three fields cropped solely with gooseberries. When interplanted with top fruit the bushes grow well and crop satisfactorily in the early years of the plantation, so bringing returns from the land earlier than is possible with tree fruits only. There are, however, certain complications as regards spraying and manuring ; these are dealt with later in this section.

Strawberry growers have found it useful to have an area of gooseberries, because during the fruit-picking season further work is available for the pickers after the day's gathering of strawberries has been dispatched. Growers

of both market-garden and fruit crops in Kent are inclined to grow gooseberries because the crop provides work for female labour between other seasonal tasks.

### Site

As is necessary with all early flowering hardy fruits, the site chosen for gooseberries should be as frost-free as possible ; "frost pockets" should be avoided. Although spring frosts harm gooseberries less often than strawberries and black currants, some loss is experienced when frosts occur during the flowering season. The swelling fruitlets also are very susceptible to frost damage, the injury ranging from a slight discoloration to total destruction. Sites exposed to the north and east are liable to wind frosts.

In wind-swept situations pollinating insects may be prevented from visiting the flowers at blossoming time. In summer it is not uncommon for bushes to suffer severe damage from wind ; sometimes the young shoots are broken off at their points of origin so that they lie uselessly across the bush. The bottoms of valleys and depressions in the land at any height may accumulate cold air on clear frosty nights in spring thus forming "frost pockets". Such positions should be avoided in favour of sites where free air drainage to lower land is possible. Bulletin No. 133, *Apples and Pears*,\* deals more fully with the subjects of spring frosts and the liability of sites to frost.

### Windbreaks

Autumnal gales cause less injury to gooseberries than to top fruits, but some shelter is desirable to prevent the breakage of growing shoots during the summer and to encourage the visits of pollinating insects at blossoming time. In the past, gooseberries have generally been grown under maturing top fruit and thus have obtained the necessary shelter from the trees, but this practice is not recommended (see p. 26). The best plan is to choose a situation that provides good natural shelter ; where this is impossible it may be necessary to plant trees to serve as a windbreak.

Little exact knowledge is available as to the best type of windbreak, its height and the effective area it can shelter, and all the trees used at present are open to objections. Thus hawthorn, hornbeam and beech, which eventually form dense hedges and provide good shelter, are slow of growth, as also are *Thuja* and spruce. *Cupressus macrocarpa*, which grows more quickly, is liable to be killed by severe winter frosts. Plum trees of the *Kentish Bush* variety, planted 12 ft. apart in a single row, or 12-15 ft. apart in two staggered rows, are also slow to provide shelter. With all these too, it is essential that the windbreak should be established a few years before the gooseberries are planted, so that shelter is provided from the beginning of the plantation.

Windbreaks should not be placed where they might interfere with the drainage of cold air from the plantation on a frosty night.

### Climate

The climate of Britain favours the growth of the gooseberry so that this fruit attains greater perfection here than in almost any other part of the world. An adequate supply of moisture while the fruit is swelling is

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\* Obtainable from H.M. Stationery Office, price 3s. 6d. (3s. 9d. by post), or through any bookseller.



essential, and high temperatures are detrimental. Growth is rapid in spring and early summer under conditions of moderate warmth and moisture.

As indicated by the acreage figures (see p. 20), the gooseberry succeeds in all the fruit-growing districts of the country. Early production is favoured by a warm spring climate and by a southerly aspect.

## Soil

Well-drained loamy soils of good depth and medium texture and containing good supplies of humus are most suitable for gooseberries. Poor drainage is very detrimental and bushes are readily killed by waterlogging. Sandy soils that are too coarse in texture or too shallow may be excessively dry in early summer and often are low in nutrient elements. Heavy clays are generally unsuitable, especially for varieties such as *Leveller* and *Careless*, though *Whinham's Industry* is more tolerant of heavy land and indeed may be over-vigorous on deep, well-drained soils of high fertility. Shallow soils dry out quickly with a consequent reduction in growth, fruit size and crop weight. The frequent surface cultivations necessary to prevent weed growth are most easily carried out on soils of light or medium texture.

The variety *Leveller* is particularly susceptible to unsatisfactory soil drainage conditions. In Sussex and in parts of Kent it does well on soils of the Tunbridge Wells Sandstone and the Hastings Beds (particularly those on the Pembury Series), having a fine sandy-loam texture with free drainage. *Careless* makes weak growth on any but the most suitable soils, but is well suited to the lighter and medium silt loams of the Wisbech area. *Lancashire Lad* thrives on the deep loamy soils of the Lower Greensand in Kent.

Gooseberries are tolerant of a fair degree of soil acidity, and are fairly resistant to chlorosis on calcareous soils, being much less affected than raspberries and strawberries by such conditions.

## PROPAGATION AND PLANTING MATERIAL

The gooseberry is propagated by hard-wood cuttings, though these do not root quite as readily as those of the black currant, especially if the conditions are not the most favourable. Cuttings should be of one-year-old wood, about 12 in. long, and made from strong, straight shoots. Old or weak bushes do not yield shoots of suitable strength for cuttings, but cuttings should be readily obtained when young, vigorous bushes are pruned. It may be advisable to use a number of bushes specially grown as "stools" for the annual production of wood suitable for cuttings, all one-year wood being cut hard back every year to ensure an ample growth of new shoots. Excessive vigour in the stools, however, may produce very strong shoots having pithy centres which are not regarded as good material for cuttings. Best results are obtained when the cuttings are taken and inserted before all the leaves have fallen from the bushes in autumn. Cuttings planted later make less vigorous growth and a proportion may be lost altogether through failure to root. Dry weather in spring may result in the loss of many late-planted cuttings.

Cuttings should be at least 10 in., preferably 12 in., long after preparation. The thin, soft wood at the tip of the shoot is removed by cutting back to a well developed bud, and the base of the cutting is cut off close to a bud with a sharp knife. When raising bushes with a clear stem or "leg" it is usual to remove all the buds, with their accompanying spines, except the four or five topmost ones, thus ensuring that no branches arise less than 4-8 in. from soil level. Occasionally, however, gooseberries are grown on the "stool" principle, i.e., with no clear "leg" and with branches arising from or below ground level. When raising such bushes it is not necessary to remove any buds from the cuttings.

It is desirable to prepare the cuttings quickly after the shoots are cut and to insert them as soon as possible. An easy-working, light-textured soil is best, though the site should not be too dry or windswept. The cuttings should be inserted deeply, almost to the buds left at the apex, about 4 in. projecting above the soil. It is usual to plant them resting on the bottom of a trench or furrow, 6 in. to 8 in. deep, and against a straight, vertical side. The trench may be made by a spade or plough. After insertion of the cuttings, the trench or furrow is filled in and trodden to ensure that the cuttings are firmly held with their bases in contact with the soil. Sometimes, if the soil tends to be heavy, a thin layer of sand is sprinkled along the trench before insertion. If frost loosens the cuttings, they should be made firm again as soon as the soil is dry enough to tread.

Rows should be 2 to 2½ ft. apart (to permit inter-row cultivations) with the cuttings 3 to 6 in. apart in the rows. Some growers transplant the rooted cuttings from 9 to 12 in. apart after one year, clearing the stems of the smaller roots near the apex to give a good clean leg. Others lift them in the second year. Weeds must be kept down by frequent hoeing. Good two-year-old bushes are suitable for planting out in their permanent positions, though many growers prefer to use three-year-old material for permanent planting.

Several virus diseases affect gooseberries and it is therefore advisable to propagate from healthy stock only.

## VARIETIES

A large number of varieties exist, though comparatively few are popular for commercial culture. The choice is governed largely by the purpose for which the fruit is to be grown; in turn this depends on climate and soil. Some districts, such as those of the Tamar Valley in Cornwall, the Cheddar Valley in Somerset, and Topsham in Devon, make a speciality of early fruit which is picked when quite small and green. *May Duke* is the chief variety in these districts; sometimes *Keepsake* (syn. *Berry's Early Kent*) is grown for early picking in other districts.

The greatest proportion of the gooseberry crop is grown for jam-making and for canning, though restrictions arising out of the late war have severely limited the latter trade. Gooseberries may be used to "set" some kinds of jam and jellies. For this purpose the berries are required in the "hard and green" state and are picked when they begin to show colour. *Careless* and *Lancashire Lad* are the principal varieties for preserving, the former being preferred for canning.



Sometimes, red varieties, such as *Lancashire Lad*, *May Duke* and *Whinham's Industry*, are allowed to ripen for the cheap dessert trade. Occasionally, whitish or pale green varieties such as *Careless*, *Keepsake*, *Whitesmith* and *White Lion* are sold in the ripe condition.

*Leveller* is grown only for dessert purposes, special efforts being made to produce berries of large size.

The research body catering for the jam industry (the British Association of Research for the Cocoa, Chocolate, Sugar Confectionery and Jam Trades) has drawn up a series of notes on the fruit characteristics which are regarded as desirable for jam. These notes were forwarded to the National Farmers' Union towards the end of 1946. The following is the note on gooseberry varieties :

Berries should be good firm fruit of medium size. Hairs are generally removed in the "snibbing" process, but even so their presence is not desirable. The skins should be neither too thin for handling nor so thick as to give a tough result in the jam. They should in any case be firm enough to withstand the machine-snibbing process.

If required for green gooseberry jam the colour should be a strong green, and the fruit should retain this colour throughout the season. For this reason, all other considerations being allowed for, green varieties are preferable to red varieties picked green. Flavour should be distinctive and rather acid.

If required for red gooseberry jam, the ripening berries of red varieties should be firm enough for "snibbing" but should not give tough skins in the jam. Mildew-resistant varieties are desired.

The following varieties have proved suitable, except for the points noted:

*Lancashire Lad*—except that it tends to turn pink on ripening.

*Careless*—also has a tendency to turn pink on ripening but in general is more satisfactory.

### Descriptive Notes on Gooseberry Varieties

The principal varieties of commercial importance at the present day are as follows ; the most widely grown are indicated by heavy type :

#### **Careless**

*Bush* : Moderately vigorous but weak on poor soils ; slightly upright when young but changing to spreading. *Berry* : Large, oval tapering to stalk end ; green, but pale green to milky white when ripe ; smooth with transparent skin. *Flavour* : Good. *Season* : Mid-season. Grown chiefly for jam-making, canning and for picking green. Widely planted in the Wisbech area.

#### **COUSEN'S SEEDLING (SANDWICH YELLOW)**

*Bush* : Usually rather weak, spreading in habit with very spiny growths. *Berry* : Medium, oval, clear yellow ; slightly hairy. *Flavour* : Good. *Season* : Late. Dessert. This variety has been widely planted in the past but, owing principally to the poor vigour of the variety, its cultivation is now decreasing. Sulphur-shy.

#### **GREEN GEM**

*Bush* : Moderately vigorous, little spreading. *Berry* : Medium large, round to oval, well shouldered ; green with pale green veins and deep green flesh. *Flavour* : Good. *Season* : Mid-season to late. A very free-cropping variety of comparatively recent introduction. Useful for picking green or for dessert.

## GUNNER

*Bush* : Vigorous, spreading, shoots long and stout. *Berry* : Large, roundish oval ; dull olive green with few hairs. *Flavour* : Fair. *Season* : Mid-season to late. Dessert. A large-fruited variety, but not nearly so popular as *Leveller*.

## Howard's Lancer

*Bush* : Vigorous, upright then spreading. *Berry* : Medium, roundish to oval ; pale green, slight yellow tinge ; skin thin, transparent. *Flavour* : Very good. *Season* : Mid-season. Useful for dessert or for picking green. An old but heavy-cropping variety, the planting of which is on the increase.

## Keepsake (BERRY'S EARLY KENT)

*Bush* : Vigorous, rather spreading with slightly pendulous growths. *Berry* : Medium to large, oval ; green ripening to whitish green ; slightly hairy. *Flavour* : Good. *Season* : Mid-season. This variety gains size very quickly and can be used for the early green-berry trade. Subject to attacks of American Gooseberry Mildew and one of the most susceptible to frost damage.

## Lancashire Lad

*Bush* : Moderately vigorous, upright when young to slightly spreading later. *Berry* : Medium large, oblong oval ; deep red ; hairy. *Flavour* : Fair. *Season* : Mid-season. Grown either for picking green or for dessert. A popular variety, widely distributed and much grown in Kent. Fairly resistant to American Gooseberry Mildew.

## Leveller

*Bush* : Of moderate vigour but rather weak on poor soils ; spreading. *Berry* : Very large, oblong oval ; yellow green, almost hairless. *Flavour* : Very good. *Season* : Mid-season. Dessert. This is the most popular dessert variety for commercial growers, but is one that demands good soil conditions with perfect drainage. It is sulphur-shy.

## May Duke

*Bush* : Moderately vigorous, upright. *Berry* : Medium to moderately large, roundish oblong ; green but ripens to a deep red ; smooth, slightly downy. *Flavour* : Fair. *Season* : Early. This variety is grown mainly in the Tamar and Cheddar valleys and other early areas, principally for the early green-berry trade.

## Whinham's Industry

*Bush* : Vigorous, fairly upright with somewhat arching shoots. *Berry* : Medium to large, oval ; ripens to a dark red ; hairy. *Flavour* : Very good. *Season* : Mid-season. A good all-round variety either for preserving or for the dessert trade. Succeeds better than most varieties on heavy soils but is very susceptible to attacks of American Gooseberry Mildew.

## WHITE LION

*Bush* : Vigorous, spreading. *Berry* : Large, oblong ; nearly white when ripe ; slightly hairy. *Season* : Late. Dessert or for picking green. The planting of this variety has declined considerably during recent years.



## WHITESMITH

*Bush* : Vigorous, upright when young but slightly spreading later. *Berry* : Moderately large, oval ; pale green with a yellow tinge. *Flavour* : Very good. *Season* : Mid-season. A very good cropping variety and one which may be used either for the green-berry or the dessert trade.

## PLANNING AND PLANTING

### Form of Bush

Gooseberry bushes with a short main stem or leg, about 4 to 8 in. long and clear of branches, are mostly grown ; all growths that arise from this main stem or from below ground level are carefully removed. On good soils, such sucker-like growths do not readily become fruitful and are susceptible to attack by American Gooseberry Mildew. Bushes with a clear stem are easier to keep free from weeds than those formed on the "stool" principle.

On poor soils, bushes of the "stool" type may be more vigorous and last a greater number of years than bushes restricted to one clear main stem. On rich soils, however, such bushes become too congested with vigorous growths that arise from below ground level and which are very susceptible to attacks of disease. With this type of bush, also, more care is required to prevent perennial weeds becoming established amongst the numerous branches.

### Planting Distances

Normally the bushes are planted on the square system with a spacing of 6 ft. for the stronger-growing varieties and 5 ft. for others. *Whinham's Industry*, however, can easily fill the area provided by an 8-ft. spacing on rich soil. Two-way cultivation is thus possible for a few years. As bushes grown on the stool system are more spreading and usually last longer, a slightly wider spacing may be desirable ; 1,742 bushes per acre are required at 5 ft. square and 1,210 at 6 ft. square.

Gooseberries need plenty of light and air on all sides, and their spiny branches are not conveniently handled when they interlace. These considerations make them less suitable than black currants for planting on the hedge system. In the south-west, where gooseberries are grown for the early green-fruit market, and the bushes are mainly under plum trees, it is not unusual to plant closely in the rows with a considerably wider spacing between the rows, a practice often adopted with black currants. Rows 8 ft. apart with the bushes 3 ft. apart in the rows are not uncommon.

Growers of *Leveller* in East Sussex plant the bushes 4 ft. apart in the rows which are spread 5 ft. or 5½ ft. apart (2,178 or 1,980 bushes per acre).

### Planting under Tree Fruits

Gooseberries grow satisfactorily under partial shade, and are often grown as an undercrop in plum, apple or pear plantations. In the Wisbech district they have often followed a strawberry undercrop in orchards, sometimes being planted before the strawberries were removed. This practice, most frequently seen on smallholdings cultivated mainly by hand, does not provide the best conditions for either undercrop. Where the top-fruit trees are large, or close enough to cast a dense shade, the gooseberry

bushes become weak and drawn. The sprays applied to the trees may damage the bushes, this risk applying especially to sulphur-shy bushes under apples. Even when the gooseberry variety is tolerant of sulphur spray, the berries may be coated with a whitish deposit that is difficult to remove. The practice of growing gooseberries under plums is less open to this objection because normally the trees do not need sprays that are harmful to the bushes.

From the nutritional point of view the potash requirement of the gooseberry is nearer that of the apple than the plum. It may, however, be desirable to grass down apples, especially dessert varieties on rich soils; in such circumstances gooseberries cannot be grown. The applications of nitrogen to the plum trees should not be so heavy as to cause the gooseberries growing under them to make excessive growth.

Owing to the greater difficulty in working between the bushes, and to the restricted conditions of air movement and light, gooseberries should be spaced more widely under trees than in the open.

### **Preparation of Land**

Gooseberries should follow a crop, such as potatoes or roots, which needs a thorough cleaning and manuring of the land and which puts the soil in good heart. The land should be free from such weeds as couch grass, twitch and bindweed, for these can be eradicated only with great difficulty and with considerable detriment to bush growth after the gooseberries have been planted. If the soil has not been well dunged for the previous crop, a good dressing of farmyard manure should be ploughed in. If no dung is available a complete fertilizer, i.e., one containing nitrogen, phosphate and potash, should be applied.

Timely preparation of the land is necessary if early planting is to be possible; provided the soil is in workable condition at the time, early planting is recommended. Planting may be undertaken as soon as the leaves of the bushes have fallen in the autumn; it is better, however, to defer it rather than to plant when soil conditions are unsuitable and no friable soil is available for working around the roots. Holes, dug with a spade or a broad-tined fork, should be about 6 to 8 in. deep and of sufficient width to allow the roots to be spread out. Firm planting by treading is necessary and it is often desirable to re-tread the soil over the roots of the bushes just before growth begins in the spring.

It may be necessary, if it has not been done in the nursery, to remove a few of the upper roots from the stems of the bushes to give a clear leg of about 6 in. When the bushes are to be grown in the stool form this trimming is not required and the lowest branch should be planted just below soil level.

### **Cultivations**

Newly planted bushes may be mulched in the spring with farmyard manure or compost to conserve soil moisture, this practice being especially valuable on soils liable to dry out quickly. The soil between the bushes should be kept cultivated with a horse-hoe or harrow or small tractor implements throughout the season to maintain a tilth and prevent growth of weeds.



In the winter it is a common practice to plough lightly between the rows, turning two or three shallow furrows towards the bushes on each side in order to leave an open furrow in the centre. In the spring these furrows are worked down by horse or small tractor implements to a good tilth; at the same time the soil in the rows of bushes is hoed by hand, all weeds being drawn into the middle. More rarely a shallow hand-digging near the bushes is carried out during the winter.

Often small tractors of various types are used for the numerous seasonal surface cultivations necessary to prevent loss of moisture and growth of weeds.

Where large fruits are required the bushes should not be grown on soils that dry out in summer; the irrigation of *Leveller* plantations might be worth while under some conditions.

### Manuring

The use of bulky organic manures, notably farmyard manure, is particularly desirable for gooseberries. Farmyard manure at the rate of about 10 tons per acre annually provides a suitable dressing on light soils; on heavier soils the dressings may be given in alternate years. Wool shoddy, greaves, fish meal and meat-and-bone meal are used when farmyard manure is not available. Unlike farmyard manure, however, none of these materials contains potash; they should be applied before the winter ploughing. Too much nitrogen may cause excessive growth and the production of vigorous shoots that readily "blow out" in the summer; also this treatment may encourage American Gooseberry Mildew.

As with the apple, adequate supply of potash is essential for the gooseberry; potash deficiency is the most common nutritional defect. Potash-deficient bushes show brown or grey marginal leaf scorch symptoms, shoot growth may be thin or severely checked and there may be no terminal growth. Defoliation is premature and dying back of the shoots and branches may occur also. The berries of affected bushes are small and may fail to ripen.

Generally, when farmyard manure is given, potash dressings are unnecessary. Frequent dressings of chloride-containing fertilizers, e.g., potash salts and muriate of potash, are liable to injure gooseberries. Sulphate of potash is preferable. Occasionally, before the war, as much as 3-4 cwt. of sulphate of potash per acre was sometimes applied annually. Such rates, however, are excessive and normal dressings should be 1-2 cwt. per acre. If a potash fertilizer containing chloride, or flue dust, is used it should be applied as soon as possible after leaf-fall and should be evenly distributed over the surface of the soil.

Magnesium deficiency also is fairly common in gooseberries on light soils, the leaves showing a broad red marginal band which eventually fades to pale yellow or cream. To rectify an acute deficiency on acid soils, magnesium limestone should be applied at rates of 1 to 2 tons per acre according to the degree of acidity; on other soils agricultural Epsom salts (magnesium sulphate) should be applied at the rate of 4 cwt. per acre until acute deficiency symptoms have disappeared. An annual application of Epsom salts, at the rate of  $\frac{1}{2}$  to 1 cwt. per acre, may be used as a preventive

measure where magnesium deficiency is liable to occur and restrict growth, but it is not recommended as a routine dressing for all soils.

Where organic fertilizers are not available, or if it is necessary to supplement them, sulphate of ammonia, at the rate of 2-3 cwt. per acre, may be applied in early spring to supply nitrogen, together with 2 cwt. per acre of superphosphate and a potash fertilizer (if possible) equivalent to 1 cwt. per acre of sulphate of potash. Phosphate deficiency has been observed in phosphate-starved experimental plots, and additions of superphosphate are advisable to prevent this occurring in the commercial plantation.

Apparently the gooseberry is not very susceptible to trace or minor element deficiencies.

In general, and provided that nitrogen is balanced by potash, it is found that mature gooseberries respond to generous manuring. On rich soils, and in areas of high rainfall, caution is necessary when adding nitrogen.

### **Pruning**

The three to five young shoots formed by the rooted cutting should be cut back to buds pointing outwards, about one-third of each shoot being left. At the end of the second year the six to eight shoots selected to form the main framework of the bush should be shortened by about half their length, the remaining shoots being shortened to 1 in. Bushes transplanted at the end of their second year should be cut back somewhat harder than when left in the nursery bed. In the latter instance they are cut hard after planting out as three-year-old bushes to obtain a balanced bush with well spaced main or leading shoots. The leaders are shortened by about half, the strong, crossing shoots are cut clean out and others are shortened to about 1 in.

The gooseberry bears its fruit both on short spurs and on shoots of the previous season's growth, the fruits on the latter, if sufficiently but not excessively vigorous, being the largest. Where the production of early berries is the chief aim, pruning is considerably lighter than where large dessert fruits are required. Pruning should be related to vigour and should be lighter for vigorous bushes and heavier on weaker ones, though generous manuring may be more effective than very severe pruning when growth is lacking.

Pruning should aim at correcting a spreading or drooping habit by cutting back the lower and outer branches to upper buds or lateral shoots, allowing also a number of upper laterals to become new leaders so furnishing the centre of the bush. In addition the bushes need to be kept sufficiently open (to facilitate picking and to admit light and air) by shortening inter-crossing shoots to 1 in. or by removing them completely if very strong.

Leaders are tipped each year, except perhaps when very vigorous or where early berry production is the objective, to ensure a supply of young lateral shoots and fruit spurs and to prevent buds remaining dormant. The proportion of leader to be removed varies with vigour, about one-third for strong bushes and two-thirds for weak ones producing few laterals. A proportion of the new laterals should be left unpruned, varying from two-thirds in number down to one-third, the greater proportion where the bushes are very vigorous. The laterals selected to remain unpruned should be those



that can receive adequate light and air without impeding the hand of the fruit picker ; they should be well distributed over the bush. Other new laterals are shortened to 1 in. As the bushes age, fewer new laterals are produced from the leaders and these then need cutting somewhat harder than previously if large fruits are desired.

Older laterals which have fruited may be removed, shortened to a group of fruit spurs, or cut back hard to produce new young shoots if suitably placed for the purpose.

Old and weak branches may be cut out as low as possible in favour of young shoots as the bushes mature. This type of pruning is especially needed when bushes are grown on the stool method. Sucker shoots from the base of the bush are usually cut clean out, but may be used for renewal if suitably placed.

*Leveller* and *Careless* should be pruned rather severely, and the stronger *Whinham's Industry* and *Howard's Lancer* more lightly. The fruits of certain varieties which decline appreciably in vigour, e.g. *Whitesmith*, rapidly lose size with age if pruned too lightly.

Excessive pruning results in too many young vigorous shoots which are likely to be unfruitful and liable to attacks of disease and to "blowing out" in winds. The severity of the pruning should be governed by the vigour of the bush and the response made to the pruning carried out in the previous winter.

Bushes grown on the "stool" system are kept moderately open to admit adequate light and to facilitate picking. Older and weaker branches are cut out completely either at or below ground level. Also it may be necessary to reduce the number of young growths arising from the bottom of the bush by cutting some of them out at their point of origin or at ground level.

## PEST AND DISEASE CONTROL

It has already been pointed out that overcrowding, excessive nitrogenous manuring and too severe pruning tend to encourage diseases of the gooseberry.

The most important diseases are American Gooseberry Mildew (Advisory Leaflet No. 273\*), European Gooseberry Mildew (Advisory Leaflet No. 24) and Die-Back (Advisory Leaflet No. 204). Gooseberry Cluster Cup Rust (Advisory Leaflet No. 198) is only occasionally serious. American Gooseberry Mildew attacks the shoots and the berries, forming a felt-like covering which is white in colour at first and later turns chocolate brown.

The principal pests are Gooseberry Red Spider mite (Advisory Leaflet No. 305), Gooseberry sawfly (Advisory Leaflet No. 30), Gooseberry aphids (Advisory Leaflet No. 176), Magpie moth (Advisory Leaflet No. 65), the Common Green Capsid bug and Winter moth (Advisory Leaflets Nos. 154 and 11). Brown scale may be troublesome at times (Advisory Leaflet No. 88).

Normally routine spraying is confined to winter applications of a 5 per cent tar-oil wash and one or two applications of a suitable fungicide to

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\* See footnote p. 19.

control American Gooseberry Mildew. The tar-oil wash for the control of aphids and the Gooseberry Red Spider mite is applied at any time from December until just before the buds swell prior to bursting. Varieties which are not sulphur-shy and are subject to attack by American Gooseberry Mildew should be sprayed with lime sulphur at 1 per cent strength (1 gallon to 99 of water) immediately after flowering and again 3 weeks later. Varieties which are liable to sulphur damage are the large-fruited *Leveller* and the small-fruited *Early Sulphur*, *Yellow Rough* and *Golden Drop*. For these, where the disease occurs, a spray containing 15-20 lb. of washing soda and 5-10 lb. of soft soap to 100 gallons of water, should be applied after flowering and be repeated once or twice at intervals of a fortnight. This latter spray is the best to use when the Mildew has already made its appearance, but as it is easily washed off by rain fairly frequent applications at 14-day intervals may be necessary in severe attacks. Lime sulphur spray tends to leave on the fruit a deposit which is difficult to remove and is objected to by canners; it should not be used except immediately after flowering and where berries are picked early.

Gooseberry sawfly may defoliate the bushes in a few days if not dealt with promptly. The caterpillars begin their attacks in the lower parts of the bushes, usually leaving only the mid-ribs of the leaves. Derris preparations (in liquid or dust form) are very effective in controlling this pest and are non-poisonous. Lead arsenate is effective also but is dangerous if the berries are to be picked soon after spraying.

### THINNING, HARVESTING AND MARKETING

The thinning of fruit, except when berries are grown for the specialized dessert trade, is rarely practised, but when a very heavy crop is set the largest berries may be picked for the early, green-berry market. For this market, the bushes are picked over several times, starting when a proportion of the fruits has attained a diameter of about  $\frac{3}{8}$  in., leaving the remainder to increase in size for a later picking. When prices fall, the crop may be left to be picked when "hard and green" either for the market or for the preserver, or it may be left to ripen. For consigning the fruit to market chip baskets of 12-lb. capacity are used both for early crops and for the best samples later, but half-sieves or other larger receptacles may be used later in the season.

Normally crops sold to preservers are cleared at a single picking when the berries are fully developed but just before they begin to change colour. Much of the fruit sold in this way is sent in bags, each holding 56 lb. The bags should be clean and preferably of a comparatively open mesh to permit adequate ventilation. There is a risk of preservers rejecting deliveries which are not up to the required "hard and green" standard. Shallow trays also are used fairly frequently for this purpose. During and since the late war, boxes of a capacity of 40-56 lb. have also been used extensively.

Berries of suitable varieties that have been allowed to ripen may be marketed as dessert fruit, though they cannot compete with those produced by the specialist dessert grower. Usually chip baskets of a capacity varying from 2 to 6 lb. are used for this dessert trade.



Grading for size has been practised by the larger growers, both for the canning trade and for the fresh-fruit market, a "blower" to remove leaves and dust being incorporated with the machine in which riddles accomplish the sizing process. Standardization of grades is at present under discussion.

Yields of fruit vary considerably. Crops of up to 14 tons per acre were obtained 30 or more years ago for the variety *Crown Bob* (now little grown). *Careless* has yielded up to 10 tons per acre in the Wisbech district, but the average yield of fruit for the whole country more nearly approximates 3 tons per acre, picked green.

Usually the prices paid for picking are arranged in the districts either by the local branches of the National Farmers' Union or by a growers' association. Piece-work rates are common for picking ordinary crops, being higher when the berries are small and lower later in the season. Daily or hourly work rates are, however, preferable when careful handling and grading are required, e.g. for picking dessert fruit. Disposal of the fruit by forward contracts was common in the Wisbech district and in Kent before the last war and is again being adopted following a period of sales at controlled prices.

### DESSERT GOOSEBERRIES

This is a specialized branch of gooseberry production, requiring a high standard of cultivation throughout. As large berries command the highest prices, all efforts are directed towards securing the maximum size of fruit. The principal centre for this specialized culture is the Newick and Chailey district of East Sussex, situated between East Grinstead and Lewes. Here are found soils of the Pembury Series derived from the Tunbridge Wells Sandstone division of the Hastings Beds formation. Soils of the Pembury Series are of a fine sandy-loam texture with no rock within 30 in. of the surface and with no sign of drainage impedance. Mainly, the holdings are under 20 acres in extent; the principal variety grown is *Leveller*, with *Gunner* and *Leader* much less favoured.

Generally growers raise their own bushes, a practice that receives as much care as that bestowed on all other operations. Straight shoots (so that the cuttings may be exactly upright when inserted), each about 12 in. long after the soft unripe tip has been cut off, are selected for cuttings. Four buds are left at the top of each cutting and the rest are removed so that when the cutting is set 4 or 5 in. into the soil there is a clean stem at of least 4 in. between soil level and the four buds to give a clear leg. Usually the cuttings are planted at least 4 in. apart in the rows which are well spaced and invariably straight and uniform. If the rooted cuttings grow away well they may be planted out permanently when one year old. Alternatively they are transplanted in nursery beds, spaced at least 6 in. apart, to remain for a year.

Farmyard or stable manure is generously used, and mulching also is resorted to for conserving moisture. Before 1939 an annual dressing of sulphate of potash at the rate of 2 cwt. per acre was usually given.

Pruning is carefully carried out to ensure that the branches are well spaced to admit adequate light and air and to allow the pickers' hands to

move freely. Spur-pruning, with fairly hard leader-tipping and the shortening of lateral shoots to about 1 in., is common. This hard pruning, involving the removal of the greater part of the young wood, is held to be necessary in order to ensure adequate size of berry. Some growers, however, allow a limited number of young well-placed lateral shoots to remain, though frequently these are tipped in the same way as the leaders.

Surface cultivations are frequent and thorough, small mechanical cultivators being extensively used between the rows with hand-hoeing in the rows.

When a good crop is set, the berries may be thinned to ensure that a large proportion of those remaining attain a size giving no more than 17-24 berries to the pound. Berries weighing one ounce each are not uncommon. Thinning takes place when the berries reach a size suitable for the early green-berry trade (about  $\frac{3}{8}$  in. diameter) in early or mid-May. This thinning was more commonly practised before the recent war, and even then was carried out mostly in seasons when the prices for early green berries were attractive.

Great care should be taken to pick and market the fruit in the correct stage. Dessert fruits when picked should have reached a stage of maturity that will ensure full ripeness when ready for sale by the retailer. They must, therefore, be picked when slightly under-ripe. Over-ripe and fully-ripe berries should not be dispatched to distant markets. Undoubtedly, the dessert gooseberry trade has suffered in the past from the marketing of samples containing either under-ripe or over-ripe fruits or both.

The bushes are picked over about three times, beginning about the end of the first week in July. Grading for size has been a common practice and usually is performed by the pickers and by eye, though a few growers use mechanical graders of the type used for plums. Such graders, however, should be carefully used to prevent damage to the fruit, and are best worked smoothly and steadily by hand rather than by power.

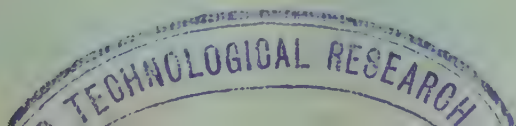
The fruit is marketed in trayed punnets or in shallow boxes of the peach tray type, holding 12 lb. of fruit. The largest fruits may be in a single layer, the boxes being padded with bracken.

The profitable life of a plantation is from 10 to 15 years, the best quality fruits being obtained from about the fifth to the eighth years.

## APPENDIX

### THE SALE OF DISEASED PLANTS ORDERS, 1927 TO 1952

The purpose of these Orders is to prevent the sale for planting of any plants (the expression "plant" includes bushes, layers and cuttings) that are substantially attacked by certain insects and pests. It is an offence under these Orders to sell, offer for sale or expose for sale any gooseberry plants that are attacked by American Gooseberry Mildew (*Sphaerotheca mors-uvae* (Schw.) Berk.), and any black currant plants that are attacked by Black Currant Gall mite (*Phytoptus ribis* Nal.).







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